

OUTSIDE-LAN CONNECTABLE IP KEY TELEPHONE SYSTEM, TERMINAL
UNIT THEREOF, MAIN UNIT THEREOF, AND
OUTSIDE-LAN CONNECTING METHOD

Background of the Invention

5 1. Field of the Invention

The present invention relates to an Internet Protocol
(IP) key telephone system that allows a terminal unit
placed outside a Local Area Network (LAN) within company to
be connected to a main unit of the key telephone system.

10 2. Description of the Related Art

As a telephone system used in a small office, a key
telephone system that accommodates a plurality of extension
terminal units and switches them with outside lines is
known. In addition, an IP key telephone system that uses
15 extension lines of the key telephone system as IP telephone
system units through a LAN within company is known. A main
unit of the key telephone system accommodates a plurality
of IP extension terminal units and switches them with
outside lines. In addition, the main unit has a function
20 as an IP server and stores and manages a database of
various kinds of information.

However, a terminal unit placed outside the LAN within
company cannot access the IP key telephone system and
retrieve information from the main unit of the IP key
25 telephone system.

Summary of the Invention

Therefore, an object of the present invention is to

provide an outside-LAN connectable IP key telephone system,
a terminal unit thereof, a main unit thereof, and a
outside-LAN connecting method that allow the terminal unit
placed outside a company or office to access the main unit
5 through an IP network and to use services and information
that the main unit supports as if the terminal unit were
placed in the company or office.

To solve the foregoing problem, the present invention
is an outside-LAN (Local Area Network) connectable IP
10 (Internet Protocol) key telephone system, comprising a key
telephone system main unit, configured to accommodate a
plurality of IP extension terminal units, for switching
calls with outside lines; and a key telephone system
terminal unit, disposed outside the LAN, for accessing the
15 key telephone system main unit through an IP network and
for functioning as an IP extension terminal unit, wherein
the key telephone system terminal unit comprises log-in
means for logging in to an IP address of the key telephone
system main unit with predetermined first ID and password,
20 and wherein the key telephone system main unit comprises IP
extension terminal unit registering means for
authenticating the first ID and password received from the
key telephone system terminal unit, registering the key
telephone system terminal unit as an IP extension terminal
25 unit, and allowing the key telephone system terminal unit
to voice communicate with another key telephone system
terminal unit in accordance with the Voice over Internet

Protocol (VoIP).

The key telephone system terminal unit registered as an IP extension terminal unit with the key telephone system main unit comprises log-on means for logging on to the key
5 telephone system main unit with predetermined second ID and password, and portal site displaying means for displaying a portal site for accessing information stored in a database of the key telephone system main unit, when the log-on means has logged on to the key telephone system terminal
10 unit. The key telephone system main unit further comprises information access permitting means for authenticating the second ID and password received from the key telephone system terminal unit and permitting the key telephone system terminal unit to access information stored in the
15 database.

In the foregoing structure, the terminal unit of the key telephone system placed outside of the LAN can access the main unit of the key telephone system through the IP network and use information stored in the database of the
20 main unit.

These and other objects, features and advantages of the present invention will become more apparent in light of the following detailed description of preferred embodiments thereof, as illustrated in the accompanying drawings.

25 Brief Description of Drawings

Fig. 1 is a schematic diagram showing a structure of an outside-LAN connectable IP key telephone system

according to the present invention.

Fig. 2 is a schematic diagram showing a process of which a main unit recognizes a KTS terminal unit.

Fig. 3 is a flow chart showing a process of which the
5 main unit recognizes a KTS terminal unit placed outside a company LAN as an IP extension terminal unit.

Fig. 4 is a schematic diagram showing an input screen for an ID and a password.

Fig. 5 is a schematic diagram showing an input screen
10 for an IP address.

Fig. 6 is a schematic diagram showing an example of a screen displayed by KTS application software.

Fig. 7 is a schematic diagram showing an example of a display and operation screen on which an IP extension
15 terminal unit operates.

Fig. 8 is a schematic diagram showing an example of a display screen of an outside line selection icon block.

Fig. 9 is a flow chart showing a process in which a KTS terminal unit placed outside the LAN configures a
20 portal site.

Fig. 10 is a schematic diagram showing an example of a display screen of a portal site log-on.

Fig. 11 is a schematic diagram showing an example of a display screen of a web portal menu.

Fig. 12 is a structural schematic diagram describing a
25 process for operating a voice message and a scheduler.

Fig. 13 is a flow chart in the case that a KTS

terminal unit (A) placed outside the LAN accesses a KTS terminal unit (B) placed inside the LAN.

Fig. 14 is a schematic diagram showing an example of a display screen of a schedule.

5 Fig. 15 is a flow chart in the case that the KTS terminal unit (B) placed inside the LAN opens a schedule screen.

Fig. 16 is a flow chart in the case that the KTS terminal unit (B) placed inside the LAN opens a voice
10 message screen.

Fig. 17 is a schematic diagram showing an example of a display of an electronic bulletin board.

Description of Preferred Embodiments

Next, with reference to the accompanying drawings, an
15 embodiment of the present invention will be described.

Fig. 1 shows a structure of an outside-LAN connectable IP key telephone system of the present invention. A main unit 10 of the key telephone system uses a LAN (or intranet) within company as extension lines, accommodates a
20 plurality of IP extension terminal units that are an IP phone terminal unit 30 and terminal units 40 and 50 of the key telephone system (hereinafter referred to as KTS terminal units), and switches them with outside lines. As a call processing protocol, the Media Gateway Control
25 (MEGACO) protocol is used. In addition, the main unit 10 has a function of an IP server and stores a database of text, image information, and so forth in a storing device

(hard disk or the like). The database has a telephone directory of users of the extension terminal units. Presence information that represents which users of the extension terminal units can communicate with others is
5 added to the database.

An outside line control module 11 transmits and receives a call to and from an outside telephone set 60 through a public telephone network. An ID · password managing module 13 performs a connecting process for an
10 access from an external terminal unit through the IP network (Internet) and performs a connecting process for the access to the main unit 10. A call processing module 12 switches an outside telephone call through the public network and a voice communication in accordance with the
15 Voice over Internet Protocol (VoIP) through the IP network to IP extension terminal units connected to the LAN within company. A database 14 stores various kinds of information including voice messages, electronic mail, and telephone directory data. A voice message processing module 15, an
20 electronic mail processing module 16, a telephone directory processing module 17, and other processing module 18 (control programs) process the respective information stored in the database 14.

The KTS terminal units 20, 40, and 50 are personal
25 computers in which software that causes them to accomplish a function of an IP extension terminal unit. The KTS terminal units 20, 40, and 50 can perform voice

communications with each other in accordance with the VoIP through the LAN within company, access the main unit 10 of the key telephone system, and transmit and receive as IP clients information such as text, image to and from the database of the main unit 10 of the key telephone system.

Fig. 2 shows a process that the main unit recognizes a KTS terminal unit. An ID and a password are input from a KTS terminal unit (B) to the main unit of the key telephone system. When the ID and password match those registered in the main unit of the key telephone system, the main unit recognizes the KTS terminal unit (B). As a result, the KTS terminal unit (B) can communicate as an IP extension terminal unit with another KTS terminal unit in accordance with the VoIP. When the main unit of the key telephone system recognizes the KTS terminal unit, the main unit of the key telephone system turns on presence information of a relevant field of the telephone directory. The presence information represents that the KTS terminal unit can perform an extension call.

Next, with reference to Fig. 3, a process in which the KTS terminal unit (A) placed outside the LAN of the key telephone system accesses the main unit of the key telephone system through the IP network (Internet) and the main unit recognizes the KTS terminal unit (A) as an IP extension terminal unit.

KTS application software installed in the personal computer is started up(at step S1). An ID and a password

that have been registered to the main unit are input to the personal computer (at step S2). Fig. 4 shows an input screen for an ID and a password.

It is determined whether or not the installed KTS application software is activated first time (at step S3). When the installed KTS application software is activated first time, an IP address of the main unit of the key telephone system is input (at step S4). Fig. 5 shows an input screen for an IP address. Once an IP address is input, since it is stored in a memory of the personal computer, it is not necessary to input the same IP address again.

The ID · password managing module 13 of the main unit of the key telephone system authenticates the input ID and password. When the ID · password managing module 13 does not successfully authenticate the input ID and password (at step S5), it does not permit the KTS terminal unit to log in to the main unit of the key telephone system. In this case, since the ID · password managing module 13 fails to register the KTS terminal unit as an IP extension terminal unit (at step S7). When the ID · password managing module 13 successfully authenticates the input ID and password (at step S5), it permits the KTS terminal unit to log in to the main unit 10 of the key telephone system and registers the KTS terminal unit as an IP extension terminal unit (at step S6). In other words, the KTS application software resides

as a KTS terminal unit in the personal computer. As a result, the KTS terminal unit can communicate as an IP extension terminal unit with other KTS terminal units in accordance with the VoIP. In this case, the main unit of the key telephone system turns on the presence information of the relevant field of the telephone directory so as to represent that the KTS terminal unit can perform an extension call.

Fig. 6 shows an example of a screen displayed by the KTS application software. Icons of KTS applications are displayed at an upper portion of the screen so as to operate them with use of word processor software or spread sheet software. An icon i1 is a KTS information screen display icon. An icon i2 is a mail transmission icon. An icon i3 is an extension call making icon. An icon i4 is an outside line mode switching icon. An icon i5 is a setting icon. An icon i6 is a telephone directory icon. An icon i7 is an incoming call history icon. An icon i8 is a response key icon. An icon i9 is a moving picture (video) display icon. An icon i10 is a portal site display icon. An icon i11 is a version display icon. An icon i12 is a help icon.

When the icon i1 is clicked, a display and operation screen as shown in Fig. 7 that operates the KTS terminal unit as an IP extension terminal unit is pulled down. When a telephone number is input, numeric buttons are clicked.

When the icon i4 is clicked, an outside telephone

number selecting icon 113 is displayed as shown in Fig. 8. Any one of outside telephone lines 01 to 10 can be selected and a telephone call can be made to the selected telephone number.

5 Next, with reference to Fig. 9, a process for configuring a portal site through which the KTS terminal unit (A) placed outside the LAN of the key telephone system accesses information stored in the database of the main unit of the key telephone system will be described.

10 After the KTS application software has been executed, a screen shown in Fig. 6 is displayed (at step S11). On the screen shown in Fig. 6, when the portal site configuring icon 110 is clicked (at step S12), a portal site log-on screen shown in Fig. 10 is displayed. An ID and a password that have been registered to the main unit
15 are input and a "Log On" button is clicked. The ID and password may be the same as those that have been input when the KTS application software has been started up. Alternatively, different ID and the password may be used.

20 The ID · password managing module 13 does not successfully authenticated the ID and password, it does not permit the KTS terminal unit to log on to the main unit (at step S15). The ID · password managing module 13 does not permit the KTS terminal unit to access information stored
25 in the database (at step S17). When the ID · password managing module 13 successfully authenticates the ID and password (at step S15), it permits the KTS terminal unit to

access information of the database (at step S16) and transmits web portal menu information to the KTS terminal unit.

When the KTS terminal unit (A) is permitted to log on to the main unit of the key telephone system, a web portal menu shown on the left side of Fig. 11 is displayed. When a menu item "Group Phone Book" is selected, a menu item "group telephone list" is displayed on the right side of the screen shown in Fig. 11. A menu item "Presence" represents that the relevant KTS terminal unit can perform an extension call. When the KTS terminal unit logs out the main unit, a menu item "Log out" displayed at an upper right portion of the screen is clicked.

Next, menu items of the web portable menu shown on the left side of the screen shown in Fig. 11 will be described. A menu item "Now" displays a list of e-mail. A menu item "Personal Phone Book" displays a personal telephone directory. A menu item "Common Phone Book" displays a common telephone directory. A menu item "Group Phone Book" displays a group telephone directory. "e-Mail" displays a list of e-Mail. A menu item "VM" checks a voice message. A menu item "Chat" performs a chat. A menu item "Internet" connects the KTS terminal unit to the Internet. A menu item "Web Cam" links a picture of a web video camera (a video camera that has a function for publishing a picture to the Internet). A menu item "Office" displays a hard disk folder of the main unit. A menu item "Setup" displays

a setting screen on the main unit side.

Fig. 12 is a structural schematic diagram describing a process in which the database of the main unit of the key telephone system is accessed and a voice message and a scheduler are operated in the state of the portal site being logged on.

Next, with reference to Fig. 13, as an example of such a process, the case that the KTS terminal unit (B) inside the LAN of the key telephone system is accessed from the KTS terminal unit (A) placed outside the LAN through the IP network will be described.

First, the KTS terminal unit (A) calls the KTS terminal unit (B) as an extension call (at step S21). When the KTS terminal unit (B) responds to the call from the KTS terminal unit (A) (at step S22), the KTS terminal unit (A) communicates with the KTS terminal unit (B) as an IP extension terminal unit (at step S23). When the KTS terminal unit (B) does not respond to the call from the KTS terminal unit (A) (at step S22), a voice message from the KTS terminal unit (A) is recorded to a voice message box of the database of the main unit of the key telephone system (at step S24). The main unit of the key telephone system recognizes the content of the voice message (at step S25) and determines whether the content contains a keyword "conference" (at step S26). When the content does not contain the keyword "conference", the main unit stores the voice message to the voice message box (at step S27). When

the voice message contains the keyword "conference", the main unit of the key telephone system stores voice recognized information to a schedule database (at step S28).

5 Fig. 14 shows an example of a schedule screen display. The schedule screen shows a conference called by the KTS terminal unit (A).

Next, with reference to Fig. 15 and Fig. 16, the cases where the KTS terminal unit (B) opens the schedule screen
10 and the voice message screen will be described.

When the KTS terminal unit (B) opens the schedule screen (at step S31), the KTS terminal unit (B) determines whether or not there is any schedule (at step S32). When there is no schedule, the KTS terminal unit (B) exits the
15 process (at step S33). When there is any schedule, the KTS terminal unit (B) determines whether or not the schedule is a voice recognized schedule (at step S34). When the schedule is not a voice recognized schedule, the KTS terminal unit (B) displays the schedule (at step S35).

20 When the schedule is a voice recognized schedule, the KTS terminal unit (B) displays a linked menu item "MSG Received" in the voice message box displaying section on the schedule screen and links the recorded voice message (at step S36).

25 When the KTS terminal unit (B) opens the voice message screen (at step S41), the KTS terminal unit (B) determines whether there is any voice message (at step S42). When

there is no voice message, the KTS terminal unit (B) exits the process (at step S43). When there is any voice message, the KTS terminal unit (B) determines whether or not the voice message contains a keyword "conference" (at
5 step S44). When the voice message does not contain the keyword "conference", the KTS terminal unit (B) displays a menu item "Voice Message Recorded" (at step S45). When the voice message contains the keyword "conference", with the schedule screen link button clicked, the message is
10 registered to the schedule database (at step S46).

Next, with reference to Fig. 17, function of an electronic bulletin board will be described. An electronic bulletin board describes speaker names, messages, and speakers' extension telephone numbers. As the KTS terminal
15 unit (A) placed outside the LAN of the key telephone system logs on to the portal site, the KTS terminal unit (A) accesses the electronic bulletin board, and is able to post a message thereon.

Next, a method for retrieving internal information of
20 the main unit will be described in brief. A portal site is configured in a KTS terminal unit. With an ID, a password, and so forth, various kinds of information can be retrieved regardless of the location of the KTS terminal unit. Even if the KTS terminal unit is placed outside the company or
25 office, the KTS terminal unit can retrieve mail information, voice message information, movie message information, telephone directory information, and business

document information. In addition, the KTS terminal unit can transmit a document to a remote party that the terminal unit has called. In addition, the KTS terminal unit can reference a scheduler stored in the main unit of the key
5 telephone system.

A voice message stored in the main unit of the key telephone system is voice recognized and registered to the scheduler database of the main unit. The KTS terminal unit placed outside the company or office can reference the
10 scheduler stored in the main unit and retrieve voice messages through the scheduler.

When a chat site that is in cooperation with a telephone function is configured in the KTS terminal unit, even if the KTS terminal unit is placed outside the company
15 or office, the KTS terminal unit can exchange short messages such as chats with member in the company. As a result, the KTS terminal unit can exchange information with member in the company on real time.

When a BBS site that is in cooperation with the
20 telephone function is configured in the KTS terminal unit, messages can be promptly exchanged with member in the company. The KTS terminal unit placed outside the company or office can exchange messages with member in the company on the BBS. Thus, information can be published to member
25 in the company. For example, the user of the KTS terminal unit can call a person who posted a message on the BBS.

When a chat site or a document site that is in

cooperation with the telephone function is configured in the KTS terminal unit, the user can send a file to a remote party whom he or she is calling. With the KTS terminal unit placed outside the company or office, the user can
5 transfer a file to a member in the company.

When presence information is stored in each KTS terminal unit, another KTS terminal unit can determine whether or not it can call another KTS terminal units. As a result, even if the user of the KTS terminal unit is
10 outside the company or office, he or she can retrieve presence information corresponding to member in the company.

As described above, according to the present invention, since the KTS terminal unit placed outside the
15 LAN accesses the main unit of the key telephone system through the IP network, even if the user is outside the company or office, with a web environment, he or she can use services that the main unit of the key telephone system provides through the portal site in the KTS terminal unit
20 as if he or she were in the company.

In other words, the user can retrieve mail information, voice message information, movie message information, telephone directory information, and business document information from the database of the main unit.
25 In addition, the KTS terminal unit can be in cooperation with the scheduler. Thus, the user can non-voice communicate with member in the company on real time.

In addition, the KTS terminal unit can send and receive a short message such as a chat to member in the company and exchange BBS messages with them on the BBS. In addition, the KTS terminal unit can forward a file to member in the company. In addition, the KTS terminal unit can check whether or not the member in the company can receive extension calls.

Although the present invention has been shown and described with respect to a best mode embodiment thereof, it should be understood by those skilled in the art that the foregoing and various other changes, omissions, and additions in the form and detail thereof may be made therein without departing from the spirit and scope of the present invention.

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